

Applicati n No.:10/761,116

Docket N .: JCLA7624-CIP

AMENDMENTS**In The Claims**

1. (original) A multi-function opto-electronic detection apparatus for detecting molecular characteristics of a test sample comprising:

a detecting light source subsystem generating sampling beams for illuminating said test sample;

a manipulation optics subsystem aligning said sampling beam onto said test sample;

a target signal processing subsystem analyzing target beams emerging from said test sample resulting from said illuminating of said sampling beam; and

a sample fixation subsystem holding said test sample; wherein

said detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem being assembled into one of a plurality of possible optical sampling setups for the detection of said test sample.

2. (withdrawn) The multi-function opto-electronic detection apparatus of claim 1, wherein said detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem are assembled into an ellipsometer for detecting ellipsometric characteristics of said test sample.

3. (currently amended) The multi-function opto-electronic detection apparatus of claim 1, wherein said detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem are assembled into a confocal scanner for detecting ~~[[surface plasmon resonance characteristics of]]~~ image of said test sample.

4. (currently amended) The multi-function opto-electronic detection apparatus of claim 1, wherein said detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem are assembled into a surface plasma resonance machine ~~[[a confocal scanner]]~~ for detecting ~~[[amplitude]]~~ surface ~~[[plasmon]]~~ plasma resonance characteristics of said test sample.

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5. (original) The multi-function opto-electronic detection apparatus of claim 1, wherein said detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem are assembled into a photon tunneling scanning microscope for observing characteristics of said test sample.

6. (original) The multi-function opto-electronic detection apparatus of claim 1, wherein said detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem are assembled into an interferometer for detecting phase interferometric characteristics of said test sample.

7. (original) The multi-function opto-electronic detection apparatus of claim 1, wherein said detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem are assembled into an interferometer for detecting optical coherence tomographic characteristics of said test sample.

8. (original) The multi-function opto-electronic detection apparatus of claim 1, wherein said detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem are assembled into a Doppler interferometer for detecting characteristics of said test sample.

9. (original) A multi-function opto-electronic detection apparatus for detecting molecular characteristics of a test sample comprising:

a detecting light source subsystem, comprising a linear polarized light source, a phase modulator, an optical reference signal generator, and a light path adjustment unit;

a manipulation optics subsystem aligning said sampling beam onto said test sample and comprising an optical alignment control, and an observe and control lens set;

a target signal processing subsystem analyzing target beams emerging from said test sample resulting from said illuminating of said sampling beam and comprising an interferometric optical signal analysis unit and a scanning signal analysis unit; and

a sample fixation subsystem holding said test sample and comprising a test sample support; wherein

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detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem being assembled into one of a plurality of possible optical sampling setups in which said phase modulator modulating phase of a light beam generated by said linear polarized light source and directing a reference beam to said optical reference signal generator and a sampling beam to said optical alignment control; said optical alignment control aligning said sampling beam onto said test sample and generating a target signal beam therefrom and directing to said target signal processing subsystem; and said target signal processing subsystem analyzing said target signal beam for resolving said characteristics of said test sample

10. (original) A multi-function opto-electronic detection apparatus for detecting biomolecular characteristics of a test sample comprising:

a detecting light source subsystem generating sampling beams for illuminating said test sample;

a manipulation optics subsystem aligning said sampling beam onto said test sample;

a target signal processing subsystem analyzing target beams emerging from said test sample resulting from said illuminating of said sampling beam; and

a sample fixation subsystem holding said test sample; wherein

said detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem being assembled into one of a plurality of possible optical sampling setups for the detection of said test sample.

11. (currently amended) A multi-function opto-electronic detection apparatus for detecting biomolecular characteristics of a test sample comprising:

a detecting light source subsystem, comprising a linear polarized light source, a phase modulator, an optical reference signal generator, and a light path adjustment unit;

a manipulation optics subsystem aligning said sampling beam onto said test sample and comprising an optical alignment control, and an observe and control lens set;

a target signal processing subsystem analyzing target beams emerging from said test sample resulting from said illuminating of said sampling beam and comprising an interferometric optical signal analysis unit and a scanning signal analysis unit; and

a sample fixation subsystem holding said test sample and comprising a test sample

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support; wherein

detecting light source subsystem, manipulation optics subsystem and target signal processing subsystem being assembled into one of a plurality of possible optical sampling setups in which said phase modulator modulating phase of a light beam generated by said linear polarized light source and directing a reference beam to said optical reference signal generator and a sampling beam to said optical alignment control; said optical alignment control aligning said sampling beam onto said test sample and generating a target signal beam therefrom and directing to said target signal processing subsystem; and said target signal processing subsystem analyzing said target signal beam for resolving said characteristics of said test sample.

12. (New) A multi-function opto-electronic detection apparatus, which has the function to measure the complex index of reflection, film thickness and related bio-characteristics of the biochip by variable incident angle ellipsometry, and has the ability to measure bio reaction characteristics by surface plasma resonance, the apparatus comprising:

a linear-polarization light source, with an adjustable light intensity and initial polarization state in order to form a sampling light beam;

a phase modulation unit, for modulating a light phase, so as to a phase of the control the sampling light beam;

a reference-light analyzing unit, having a non-polarized splitter, an analyzing plate, and two optical sensors;

a variable-incident-angle optical member, having a lens with parabolic surface, a spherical reflection mirror and a shifting stage for loading a prism, so as to adjust an incident angle of the sampling light beam onto the biochip; and

a signal detection and switching unit, for switching the incident angle for use in ellipsometric measurement or surface plasma resonance measurement.

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13. (New) The multi-function opto-electronic detection apparatus of claim 12, wherein the signal detection and switching unit includes an analyzing plate, an optical detector and a rotation member, so that the analyzing plate is rotated for having switching function.

14. (New) The multi-function opto-electronic detection apparatus of claim 12, wherein the signal detection and switching unit includes an analyzing plate, an optical detector and a rotation member, so that the analyzing plate and the optical detector are rotated for having switching function.

15. (New) The multi-function opto-electronic detection apparatus of claim 12, wherein the signal detection and switching unit includes an analyzing plate, an optical detector and a shifting member, so that the analyzing plate is shifted for having switching function.

16. (New) The multi-function opto-electronic detection apparatus of claim 12, wherein the linear-polarization light source emits a coherence light beam.

17. (New) The multi-function opto-electronic detection apparatus of claim 12, wherein the linear-polarization light source includes a laser diode and a linear polarizer.

18. (New) The multi-function opto-electronic detection apparatus of claim 12, wherein the linear-polarization light source includes a light emitting diode and a linear polarizer.

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19. (New) The multi-function opto-electronic detection apparatus of claim 12, wherein the phase modulation unit includes a compensator, a liquid crystal phase modulator, or an optical elastic phase modulator.

20. (New) The multi-function opto-electronic detection apparatus of claim 12, wherein the variable-incident-angle optical member comprises one selected from the group consisting of a reflection mirror, a triangular prism, and a penta prism.

21. (New) The multi-function opto-electronic detection apparatus of claim 12, wherein the reference-light analyzing unit includes one selected from the group consisting of an optical diode and an optical charge coupled device.

22. (New) The multi-function opto-electronic detection apparatus of claim 12, wherein signal detection and switching unit comprises an optical detector, the optical detector comprise one selected from the group consisting of an optical diode and an optical charge coupled device.